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"Effect of Supervised Exercise Program on Shoulder Function in Post Mastectomy Patients"

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ABSTRACT: -

Background: Surgery and treatments for breast cancer may lead to upper extremity impairments, functional limitations and disabilities such as pain, numbness, stiffness, lymphedema, tightness, decreased strength, reduced range of motion (ROM) and decreased activity tolerance. Patients with post mastectomy surgery tend to experience a protracted recovery time and more functional impairments than those with breast conservation therapy, chronic impairments and functional limitations may exist several years after treatment reducing physical activity, quality of life and heightening psychological distress. Due to surgery, there is reduced use of the affected upper extremity for daily activities that is leading decreased strength and range of motion.

Aim: To study the effect of supervised exercise program on shoulder function in post mastectomy patients"

Material and Methods: A study was carried on 50 individuals in post mastectomy patients across multiple hospitals over Pune were selected according to inclusive and exclusive criteria and were evaluated for assessing range of motion of shoulder, elbow and wrist.

Results: Our results showed significant improvement in supervised exercise program group with p-value (<0.0001) in increasing range of motion of shoulder in post mastectomy patients.

Conclusion: Present study concluded that supervised exercise program was effective in improving shoulder range of motion in post mastectomy patients.

Keywords: Post mastectomy, Supervised exercise program, Joint range of motion

INTRODUCTION

Cancer involves abnormal cell growth with the potential to invade or spread to other parts of the body. These contrast with benign tumors, which do not spread[1].Signs and symptoms include a lump, abnormal bleeding, unexplained weight loss, and a change in bowel movements[2]. Globally, about 1 in

6 deaths is due to cancer[3]. About one-third of deaths from cancer are due to tobacco use, high body mass index, alcohol use, low fruit and vegetable intake, and lack of physical activity and also the second leading cause of death. Tobacco use is the most important risk factor for cancer and is responsible for approximately 25% of cancer deaths. Cancer-causing infections, such as hepatitis and human papillomavirus (HPV), are responsible for approximately 30% of cancer cases in low- and lower-middle-income countries.[4] Comprehensive treatment is reportedly available in more than 90% of high-income countries but less than 15% of low-income countries[5]. The total annual economic cost of cancer in 2010 was estimated the US $ 1.16 trillion[6]. Only 1 in 3 countries reported high-quality cancer incidence data in 2019[7]. Lymphedema can be defined as the accumulation of body fluids that occur as a result of lymphatic fluid dysfunction. This reduction in lymphatic flow may result from congenital malformations or acquired lymphatic discharge. Although lymphedema usually affects one or more organs, its effects can be seen in other organs. Whatever the pathogenesis, it is often an incurable, chronic condition, causing long-term physical and psychological distress to the patient and a complex medical challenge to the physician. Hereditary lymphedema and domesticated lymphedema-related conditions are very common: the reported frequency varies from one-case reports to a 1:500 birth rate (Klinefelter's syndrome) [8].

MATERIALS AND METHODOLOGY:

Methodology:

- Study Design:- Intervention based study
- Study Setting:- In and around Pune
- Target Population:- Post mastectomy
- Place Study:- Pune
- Sample Size:- 50

Inclusion criteria:

- Post mastectomy Patients
- Patients with post mastectomy more than 6 months
- Women who would perform unilateral mastectomy with lymph node dissection.
- Subject who are willing to participate.

Exclusion Criteria:

- Patients with bone or skin cancer
- Women who had motor and neurological deficit in the upper limb
- Patients having open wounds
- Patients undergoing radiation therapy

- Women unable to comprehend the exercises proposed.

Outcome measures:

1. Range of motion of the shoulder, elbow and wrist.[15]

Procedure:

Ethical clearance was taken from Institutional Ethical Committee and Participants were selected according to inclusion and exclusion criteria. Aim, objectives and method of study was explained to the participants and written consent was taken. Exercises program was design implemented through review of related literature. All instruction written in simple language which was understanding to patients and also supplement with photos. At the initial visit, data were collected on sociodemographic data pertinent to age, sex, education…etc. Also pre test disease related information, pain assessment sheet, ROM assessment, and functional status were assessed for each subjects before exposure to the exercise intervention. Both of the groups received treatment for duration of 60 minutes with appropriate rest period as required. Number of treatment sessions was 3 times per week (alternate days) for 6 weeks.The participants were divided in two groups- Experimental group: Group A was given supervised exercises where the patients was initially treated for 30 min of active/active assisted range of motion exercises for cervical rotation, shoulder, elbow, wrists fingers like wand exercises, elbow winging and side bends followed by stretches of all joints which were included according to the patient's muscle tightness mostly chest wall stretch, shoulder blade stretches. After every treatment range of motion of all the included joints were taken. Control group: Group B was received routine care and analgesic in accordance with physician orders. After treatment range of motion of all the included joints were taken. Accordingly, results were analysed.

Statistical Analysis-

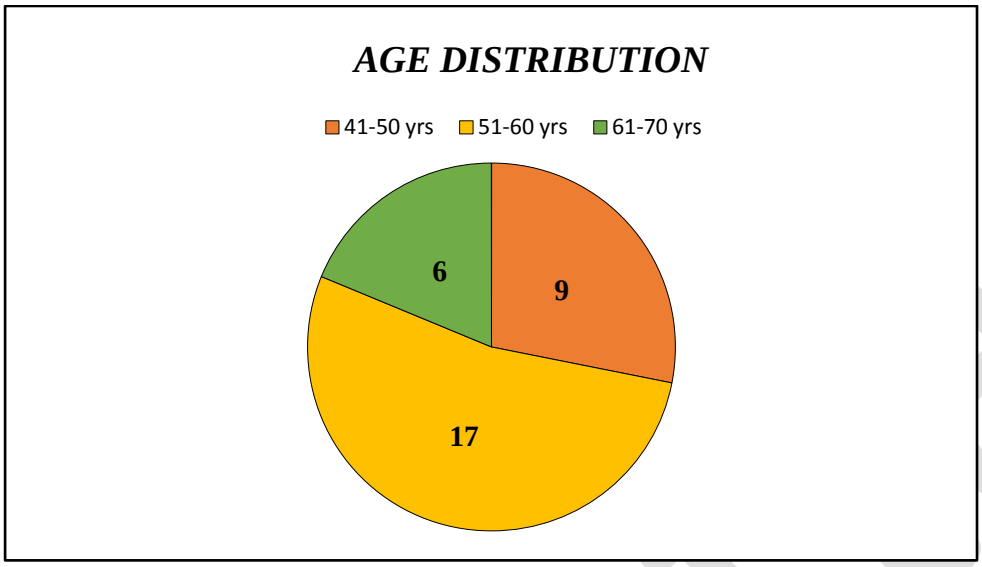
1. Microsoft office excels 2016 and Instat software was used for statistical analysis.
2. Average values for various parameters were calculated
3. Level of significance was set at 5% i.e. <0.0005

RESULT

Table & Graph 1

Baseline demographic data

Years	41-50	51-60	61-70
Age Distribution	9	17	6

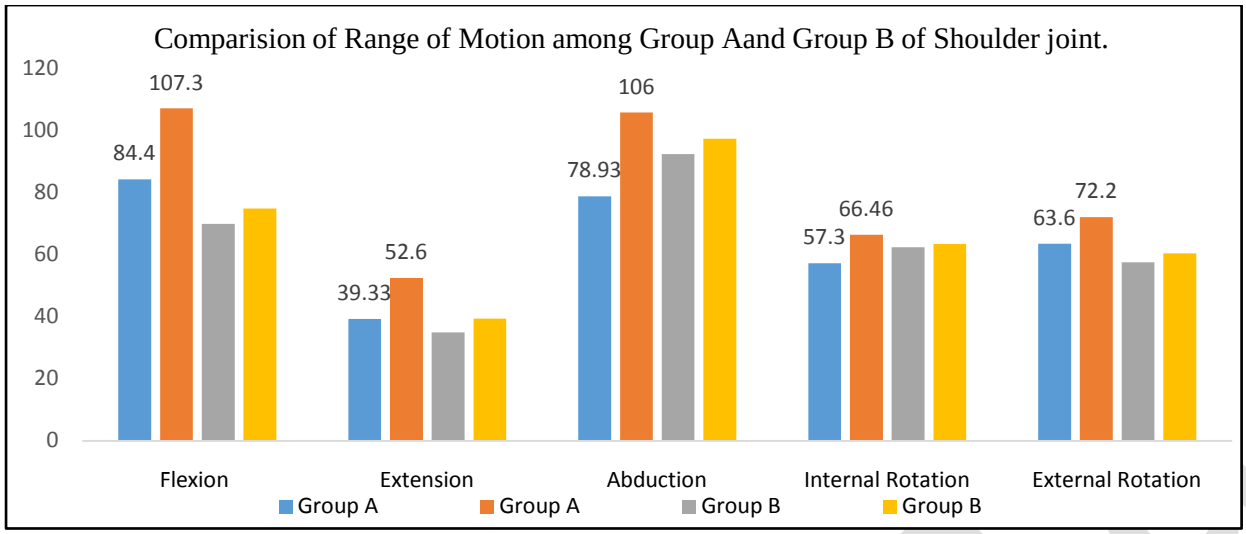


Interpretation: Amongst the total sample size (30) there were 17 females between 51-60 age groups 9 in 41-50 and 6 in 61-70 age group.

Table & Graph 2

Comparison of Range of Motion of shoulder joint among Group A and B.

	Group A			Group B		
Shoulder joint	Before Treatment	After Treatment	P value	Before treatment	After treatment	P value
Flexion	84.4± 15.34	107.33±12.37	< 0.0001	70±13.31	72 ±13.8	0.4728
Extension	39.33±8.42	52.6±4.99	< 0.0001	35±14.47	39.5±9.57	<0.0001
Abduction	78.93 ±12.30	106±15.94	< 0.0001	92.5±15.17	94±15	<0.0001
Internal rotation	57.33± 5.62	66.46±3.29	< 0.0001	62.5±8.83	63.5±8.31	0.00065
External rotation	63.66± 9.89	72.26±6.34	< 0.0001	57.6±81	60.5±6.76	0.00032

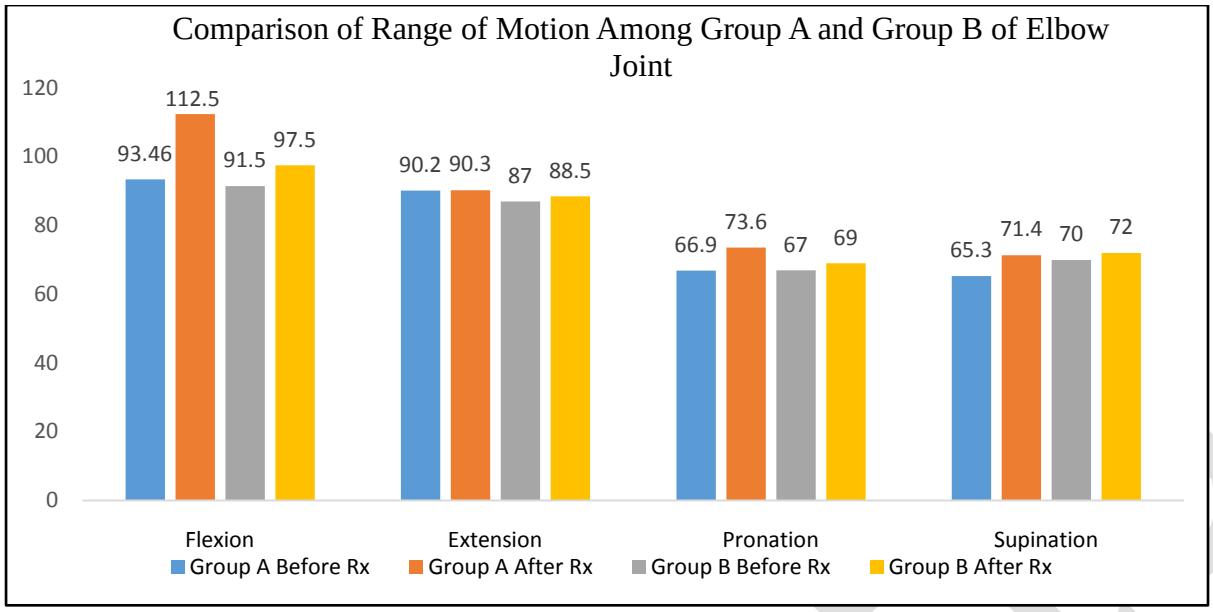


Interpretation: Group A showed extremely significant improvements (<0.0001) in increasing shoulder range of motion as compared to Group B

Table & Graph 3

Comparison of Range of Motion of elbow joint among Group A and B.

	GROUP A			GROUP B		
Elbow joint	Before Treatment	After Treatment	P value	Before Treatment	After Treatment	P value
Flexion	93.46±5.34	112.53±8.01	< 0.0001	91.5±11.18	97.5±11.93	< 0.0001
Extension	90.2±6.79	96.86±5.35	< 0.0001	87±11.41	88.5±10.85	< 0.0001
Pronation	66.93±6.78	73.66±3.84	< 0.0001	67±6.44	69±5.33	< 0.0001
Supination	65.33±5.81	71.4±3.01	< 0.0001	70±5.73	72±4.45	< 0.0001

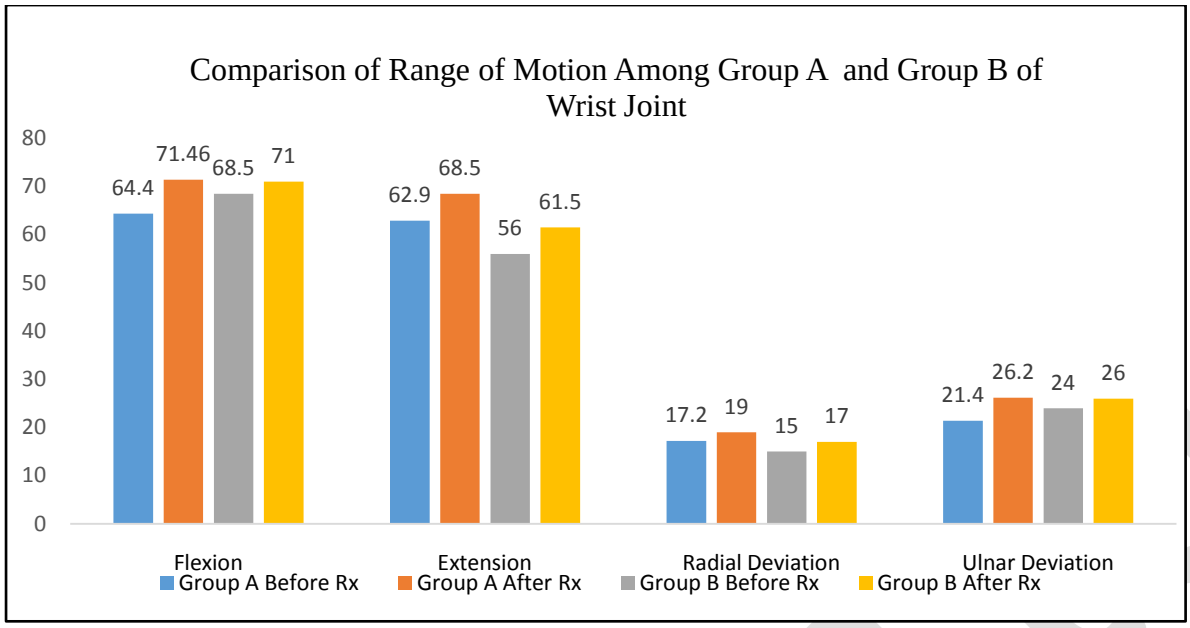


Interpretation: Group A showed extremely significant improvements (<0.0001) in increasing range of motion of elbow flexion as compared to Group B.

Table & Graph 4

Comparison of range of motion of wrist joint among group A and B.

	Group A			Group B		
Wrist Joint	Before Treatment	After Treatment	P value	Before Treatment	After Treatment	P value
Flexion	64.46±7.91	71.46±5.38	0.00032	68.5±9.12	71±12.7	0.00032
Extension	59.4±3.86	67.86±1.92	0.00032	56±6.34	61.5±5.6	0.00032
Radial Deviation	15.46±2.06	19. 33 ±0.8	0.00032	15±4.6	17±1.3	0.00032
Ulnar Deviation	21.4 ±3.83	26.26±1.70	0.00032	24±4.6	26±3.8	0.00032



Interpretation: Both Group A and Group B showed extremely significant improvements (<0.0001) in increasing wrist range of motion.

DISCUSSION

In Cancer, patient's quality of life particularly in relation to perform activities of daily living is profound and pervasive. Cancer is associated with psychological distress and can impose a limiting a patient's ability to work. [13] Cancer patients have sensory and motor deficits leading to inappropriate proprioceptive, impaired postural control and decreased mobility of joints. [14, 15]

The aim of the research was to study the effect of supervised exercise program on shoulder function in post mastectomy patients so we assessed the range of motion of shoulder, elbow and wrist of the affected upper extremity. As lymph nodes are present along the course of lymphatic vessels in elbow, axilla, knee and groin [9]. Functions of the lymph nodes are: i] When lymph passes through the lymph nodesthe water and electrolytes are removed and proteins and lipids are retained in the lymph. ii] Bacteria and other toxic substances are destroyed by macrophages due to which lymph nodes are called defense barriers [10].

Patients suffering from cancer might undergo a surgery for lymph nodes removal; a lymph node dissection is a surgical procedure that involves the removal of lymph nodes near the tumour. This treatment may involve: a) Regional lymph node dissection, which is the removal of some lymph nodes near the tumour area. b) Radical lymph node dissection, which is the removal of all the lymph nodes near the tumour area once the nodes are removed there is obstruction to lymph flow due to

which the volume of extracellular fluid is increased and oedema occurs. Lymphedema has shown that characteristic features of this disease include fibrosis, hyperkeratosis, chronic inflammation, and adipose deposition. Its function is to transport protein rich interstitial fluid [(11)].

Greenlee et al showed conservative estimates suggest that the venous system is responsible for absorbing more than 90 % of extracellular fluid produced as a consequence of cellular metabolism and capillary perfusion. The remaining 10% is transported by the lymphatic system [(8)]. It has a large reserve for fluid transport and mild disturbances in function.When the system is damaged or overloaded the interstitial fluid accumulation can occur and manifest as pitting edema. This fluid can have major effects on the cellular behavior of the affected limb, resulting in activation of inflammatory cascades and adipose cell differentiation. Chronic fluid accumulationcan occur in patients with early-stage lymphedema which leads to progressive inflammation. Chronic Inflammation and Fibrosis Chronic inflammation and fibrosis are histological hallmarks of lymph edema.[(12)]The lymphatic vessels became progressively fibrosed and occluded due to proliferation of surrounding smooth muscle cells.

CONCLUSION

This study concluded that supervised exercise program was effective in improving shoulder range of motion in post mastectomy patients.

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